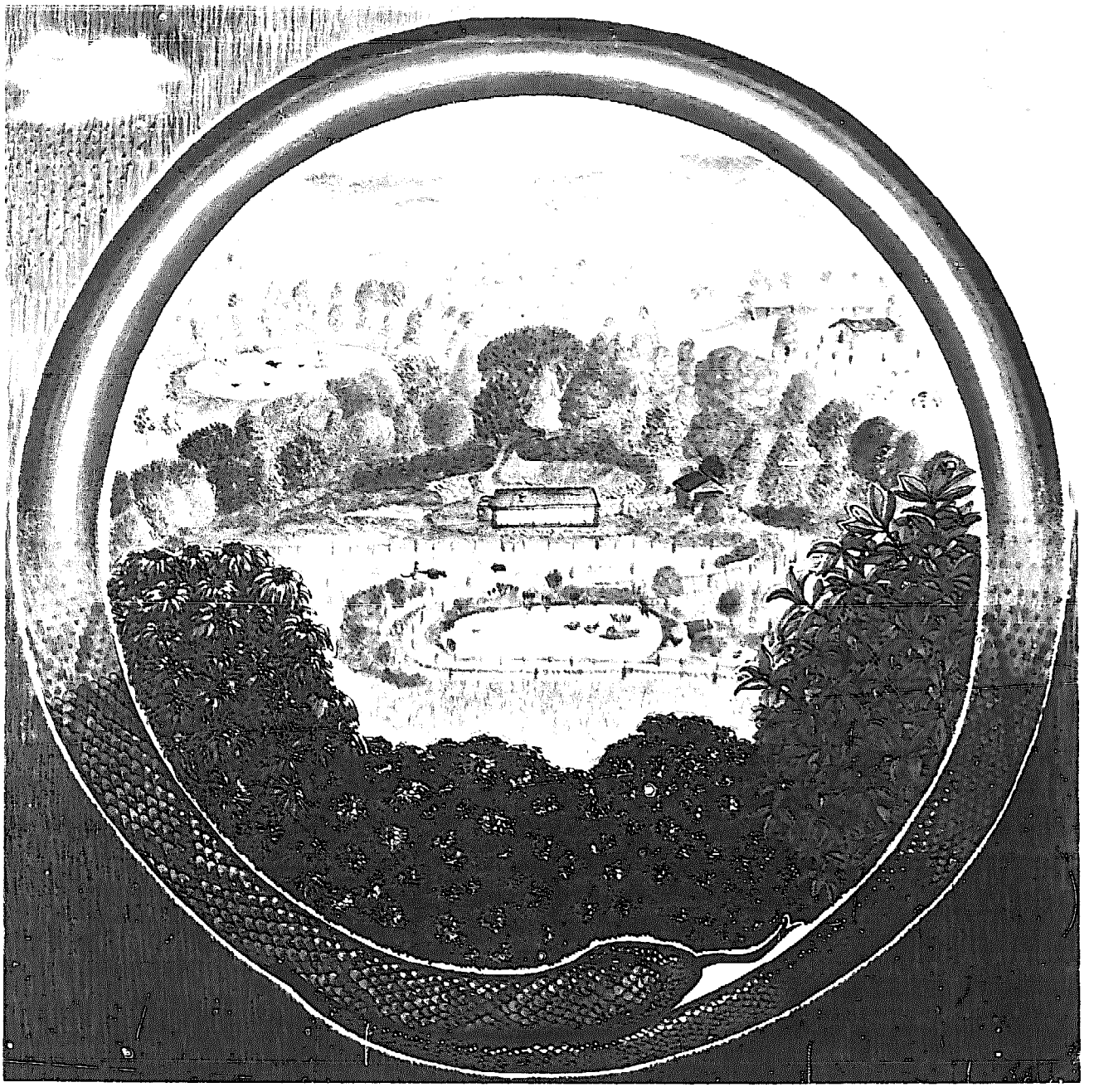
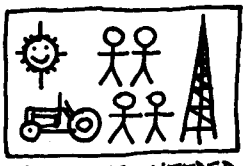
PERMA-CULTURE TWO

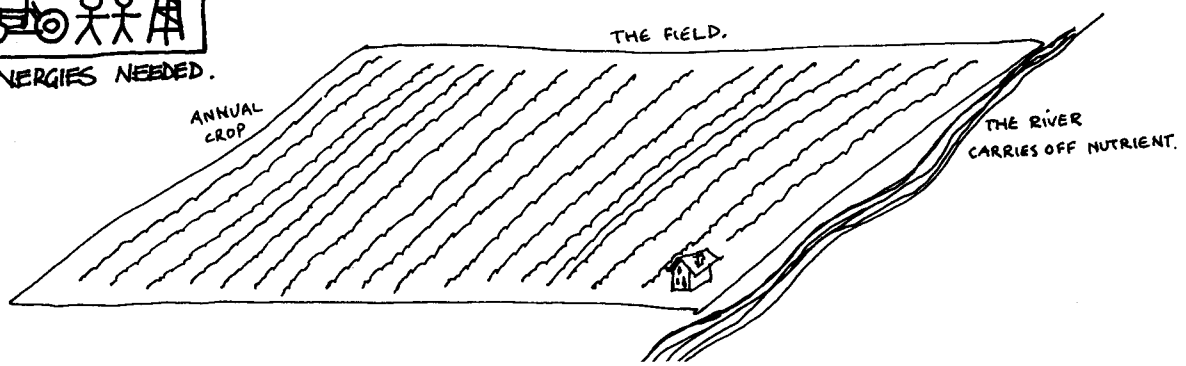
Practical Design for Town and Country
in Permanent Agriculture.

By Bill Mollison.

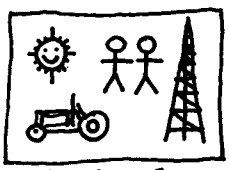




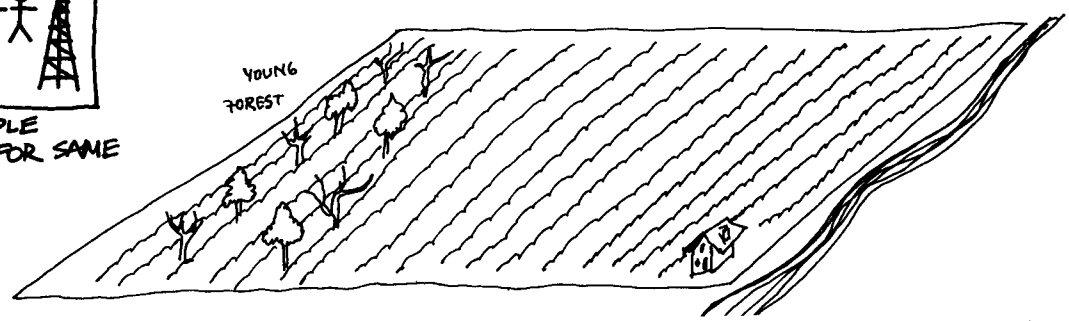
ENERGIES NEEDED.



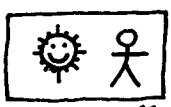
1 ANNUAL AGRICULTURE. HIGH CONSUMPTION OF ENERGY.



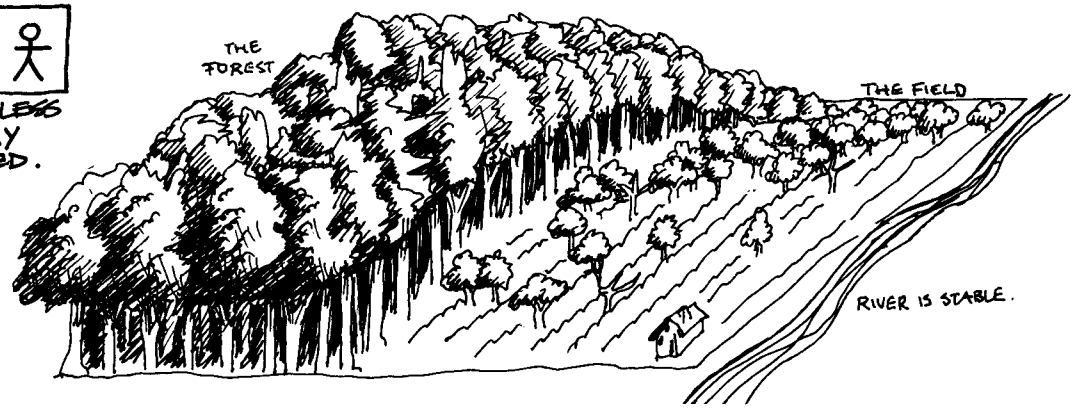
LESS PEOPLE NEEDED FOR SAME YIELD.



2 CONVERSION TO PART YIELDING FOREST — ENERGY NEEDS AND NUTRIENT LOSS REDUCED.

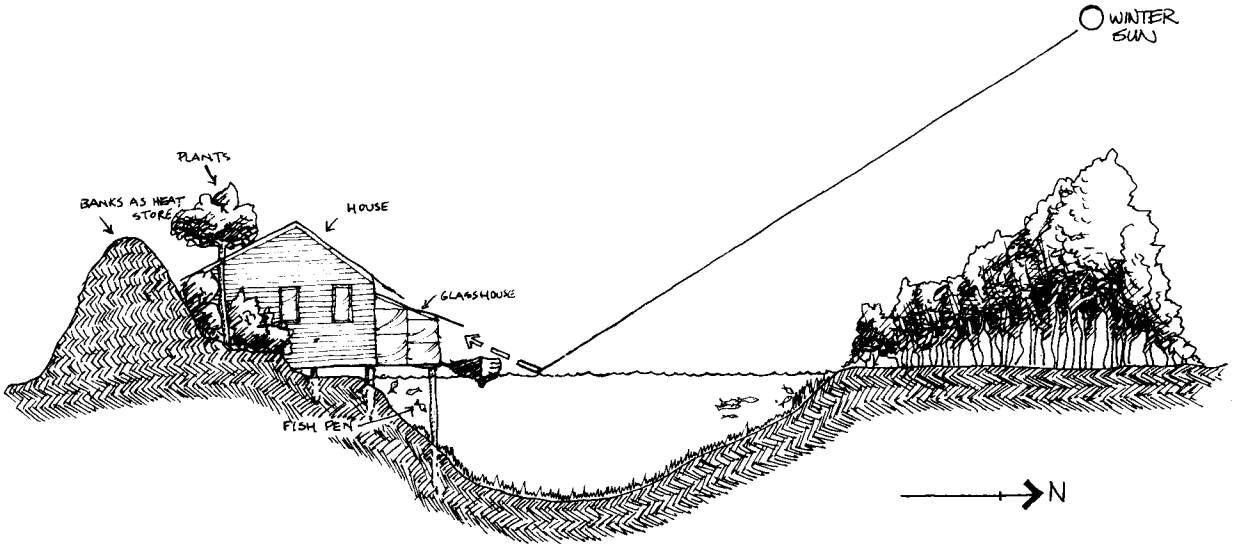


MUCH LESS ENERGY NEEDED.



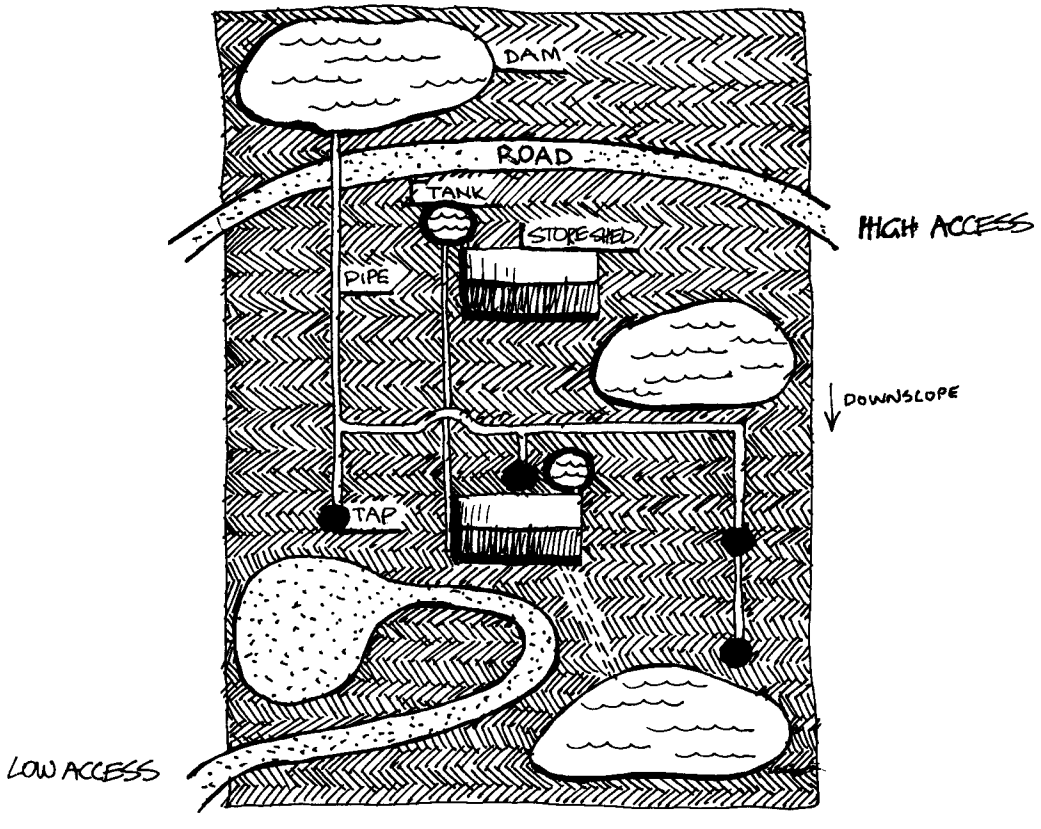
3 CONVERSION COMPLETED. YIELDING FOREST SUPPLIES FUEL AND NUTRIENTS FOR A SMALL ANNUAL GARDEN. THERE IS A HIGHER TOTAL YIELD.

FIG. 1·1: CONVERSION FROM ANNUAL TO PERENNIAL CROPS OVER A LARGE AREA REDUCES WORK NEEDS AND ABOLISHES NEED FOR EXTERNAL ENERGY SOURCES.

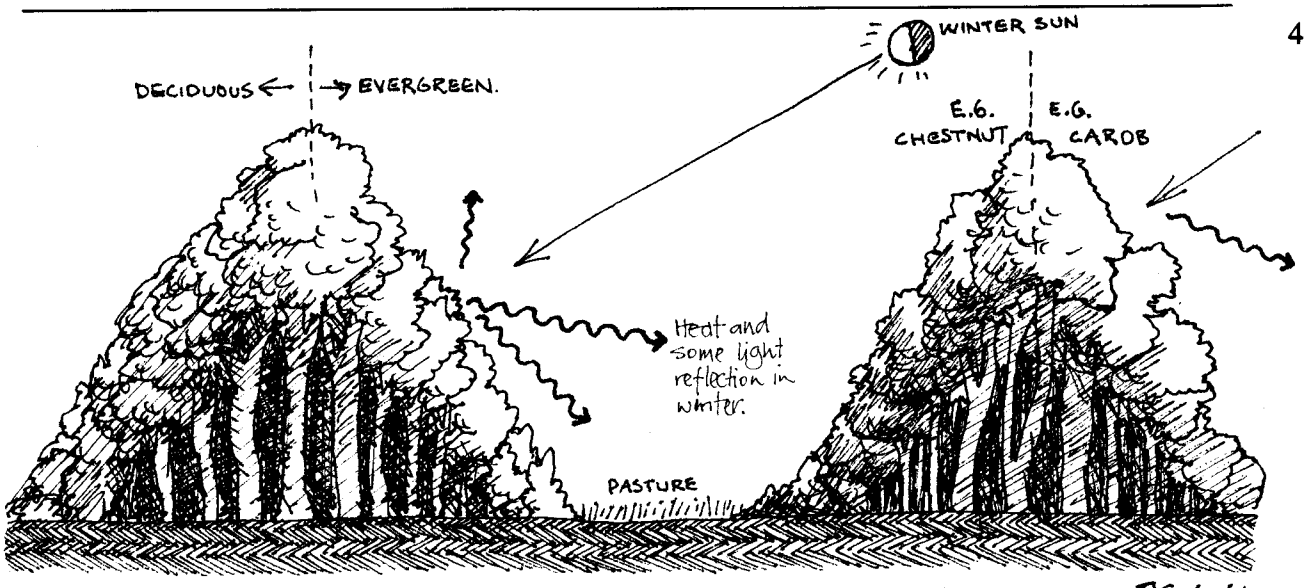


DAMS AS WINTER SUN REFLECTORS WILL INCREASE DAWN, EVENING OR WINTER HEAT ON BANKS TO S(N). GLASSHOUSE, PLANTS SITED THERE ALL BENEFIT

· FIG. 2·9



IDEALIZED. DOWNSLOPE LAYOUT OF WATER, BUILDINGS, ACCESS. FIG. 2·10:



IDEAL STRUCTURE OF TREE CROP SPECIES ON PLAINS. DECIDUOUS SPECIES TO SOUTH (N.), EVERGREEN SPECIES TO NORTH (S.). TREES ACT AS WINDBREAKS, HEAT REFLECTORS, STOCK PROTECTORS, CLIMATIC BUFFERS, CROP DIVERSIFICATION, POSSIBLE FUEL PRODUCERS, EROSION PROTECTORS, DROUGHT-PROOF STOCK FEED. FIG.4.4:

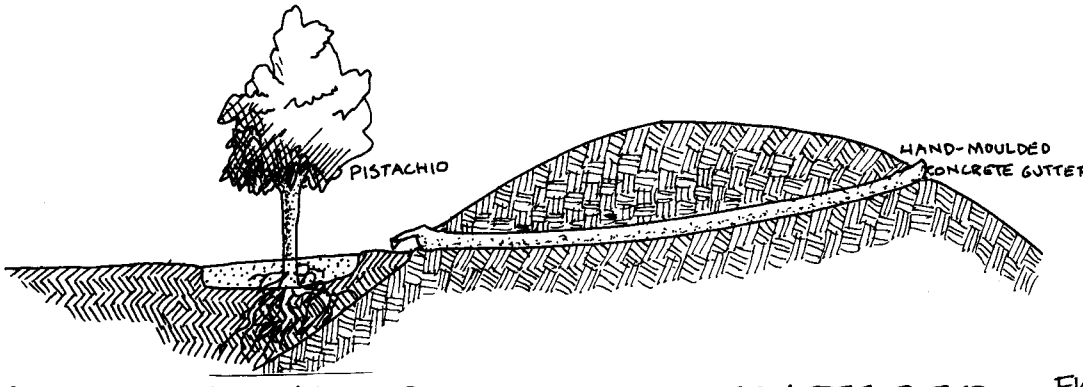
- buffers climatic effects, particularly that of drought. This alone may double yield in protected fields;
- provides on-farm liquid fuels after simple distillation;
- prevents soil erosion, especially wind erosion and water loss;
- reduces need for heavy fuel consumption as annual crop is reduced in area;
- reduces groundwater table and prevents salting of soils; and
- provides drought-proof and cold-proof concentrated feed for stock in periods when pastures are at low yield.

In a world governed in its economics by the cost of energy, farmers need to be fully aware of the potential of polyculture. A one-bet system can fail on one factor. As a local permaculture is zoned, so are farmers zoned from market, hence, supply centres. Increasing distance means increasing cost and greater reliance on home production of vital materials, especially manures and fuels. Attention should be given therefore to the tree species selected, with respect to local needs and distance from the market.

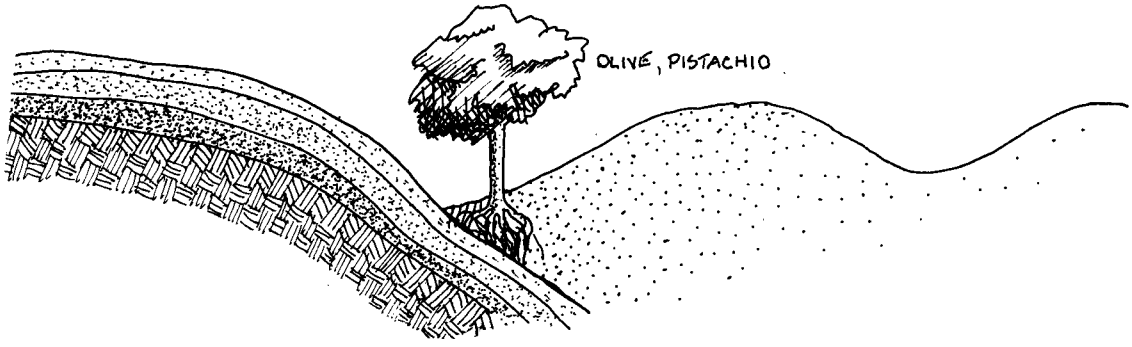
1 On-Farm and Urban Production of Fuels from Plants

It is taken for granted here that every farmer needs to be a gardener, for if his commercial enterprises founder on fuel costs or markets, then at least he can still live off (and on) his farm. The importance of the house and garden goes beyond this, however, as it is in the garden and nearby that he can try out small-scale techniques of low-energy agriculture to be applied to larger areas, and produce the seedling trees and shrubs for permaculture planting.

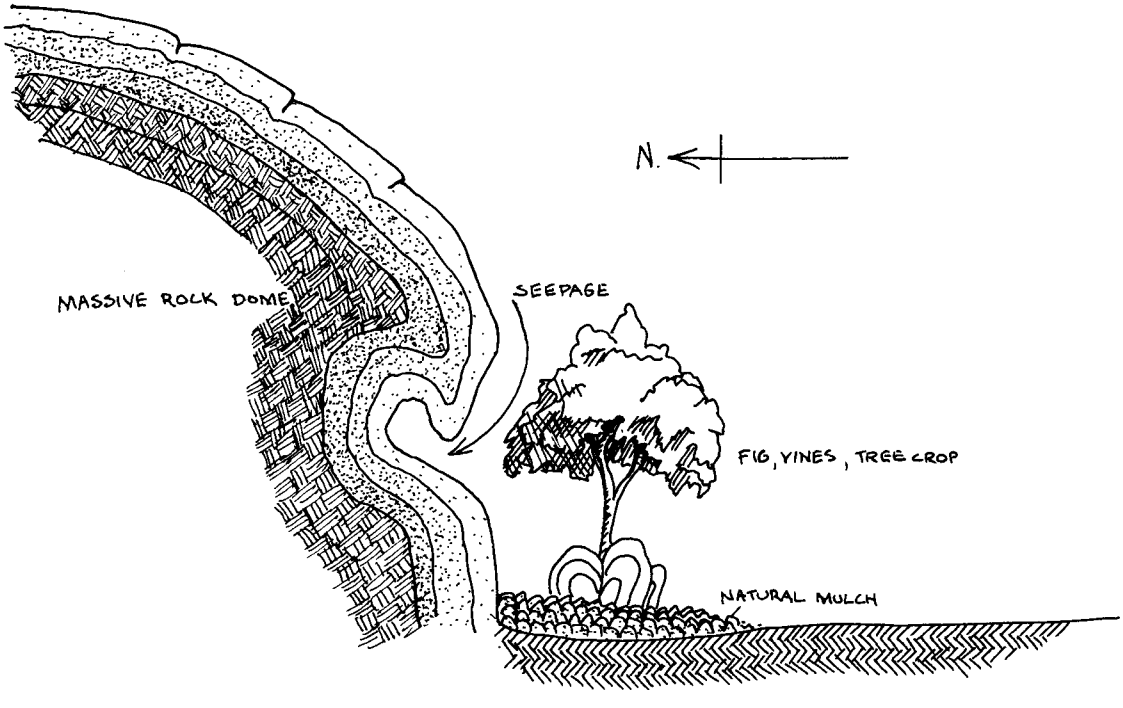
The critical importance of low or no-tillage grain and starchy root crops, of sugar-rich carob beans, plums, or sugar cane and beets is that all can be fermented to alcohol fuel. Every householder and farmer can thus produce a clean-burning fuel for cooking, light, and essential transport. Most areas have (legally or illegally) a gifted distillation expert, although (not surprisingly) we hear little of this as a government-encouraged enterprise. It is the very basis of self-reliance that is available from such crops, and the pay-off is that the protein value of fermented foods is not reduced, but enhanced. (Dried waste grains yield 20-25% protein.)



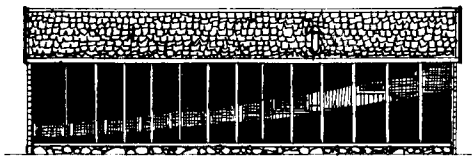
AT WOMIKUTTA : SMALLER ROCK DOME SUFFICES FOR A TREE OR TWO. FIG.5.5



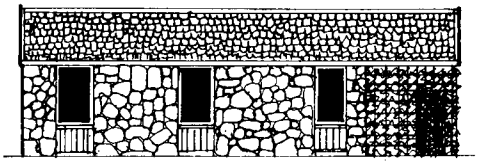
AT WOMIKUTTA: MASSIVE ROCK LEADS WATER TO BASE OF DUNES. FIG.5.6



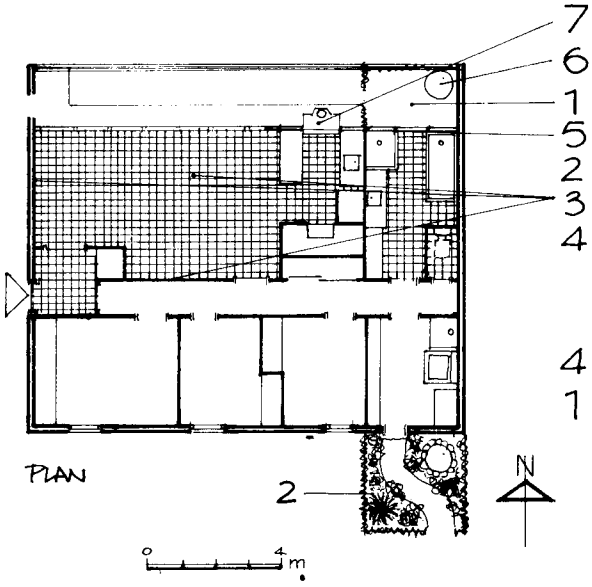
AT KATJIKATJIDARA. FIG.5.7



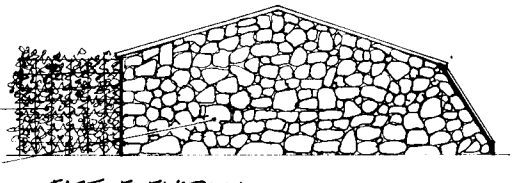
NORTH ELEVATION



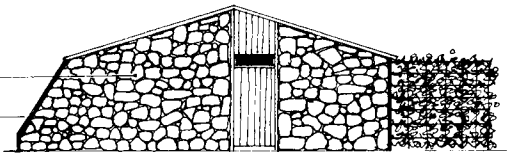
SOUTH ELEVATION



PLAN



EAST ELEVATION



WEST ELEVATION

1 GLASS HOUSE ALONG FRONT WALL: HEATING SYSTEM, SEEDLING PROPAGATION, GROWING OF VEGETABLES (UNSEASONAL) AND PERENNIALS NOT NORMALLY GROWABLE.

2 SHADEHOUSE IN MOST OF TEMPERATE, SUB TROPICAL, + TROPICAL AUSTRALIA: COOLING SYSTEM - POND WITH DRIP, FERNS, SHADE PLANTS. VENT AS IN FIG. 6.2

3 HIGH THERMAL MASS FLOOR AND WALLS (CONCRETE, STONE, QUARRY TILE, EARTH etc).

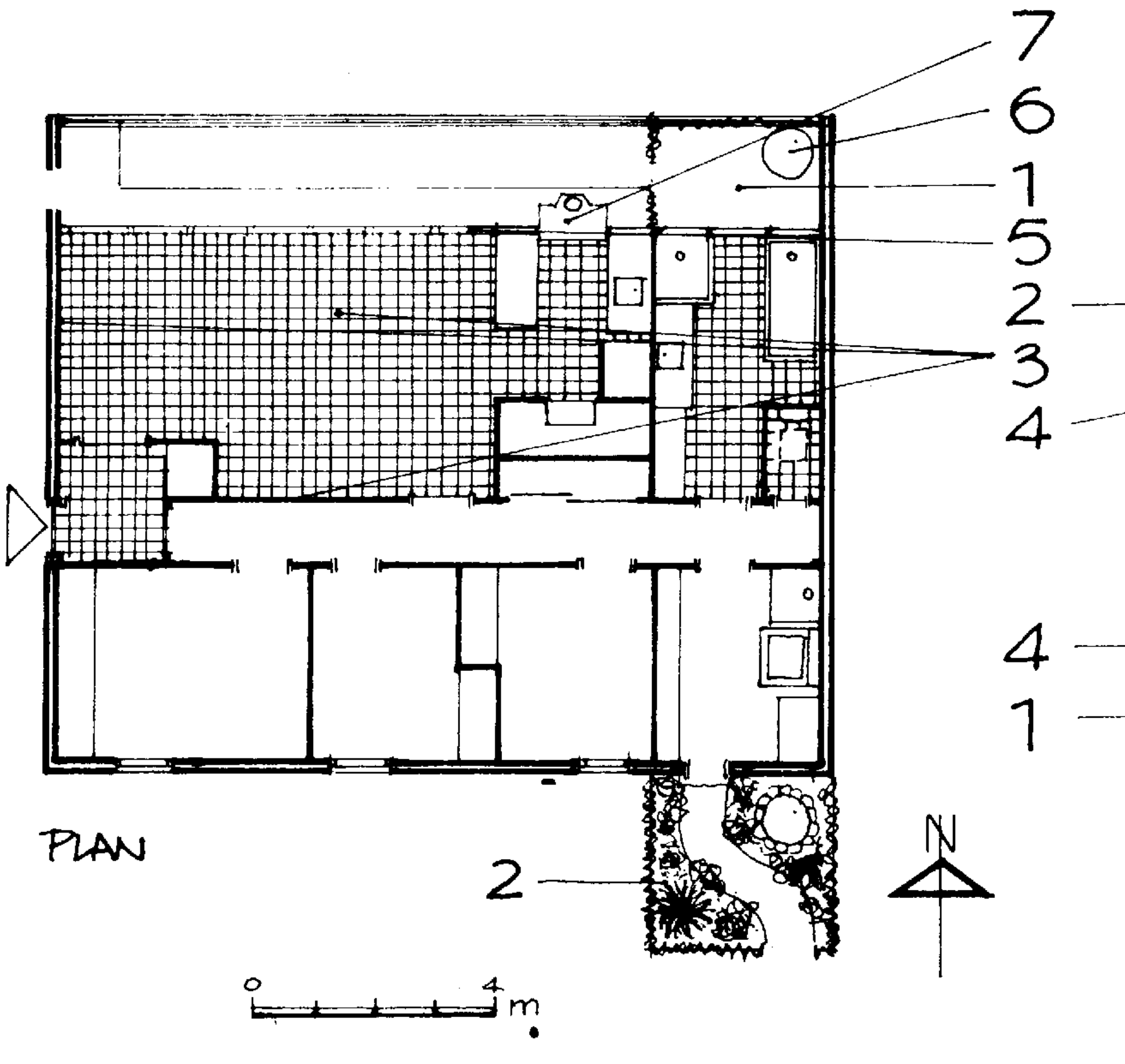
4 NO WINDOWS IN EAST AND WEST WALLS, FEW IN SOUTH WALL.

5 GLASS WALL WHICH CAN BE OPENED INTO GLASSHOUSE (SLIDING GLASS DOORS) PLUS FLOOR TO CEILING HEAVY, LINED, AND PELMETTED CURTAINS.

6 GREY-WATER HOLDING POND (FROM KITCHEN AND BATHROOM) RELEASING WASTE HEAT INTO GLASSHOUSE. OVERFLOW VALVE RELEASE TO ANNUAL GARDEN IRRIGATION, OR DUCK/FISH POND.

7 POSSIBLE SLOW COMBUSTION STOVE RADIATING FLUE HEAT INTO GLASSHOUSE.

LOW ENERGY, COST EFFECTIVE DWELLING. FIG. 6.1
(MODIFIED AFTER COLDICUTT AND WHITE[8]).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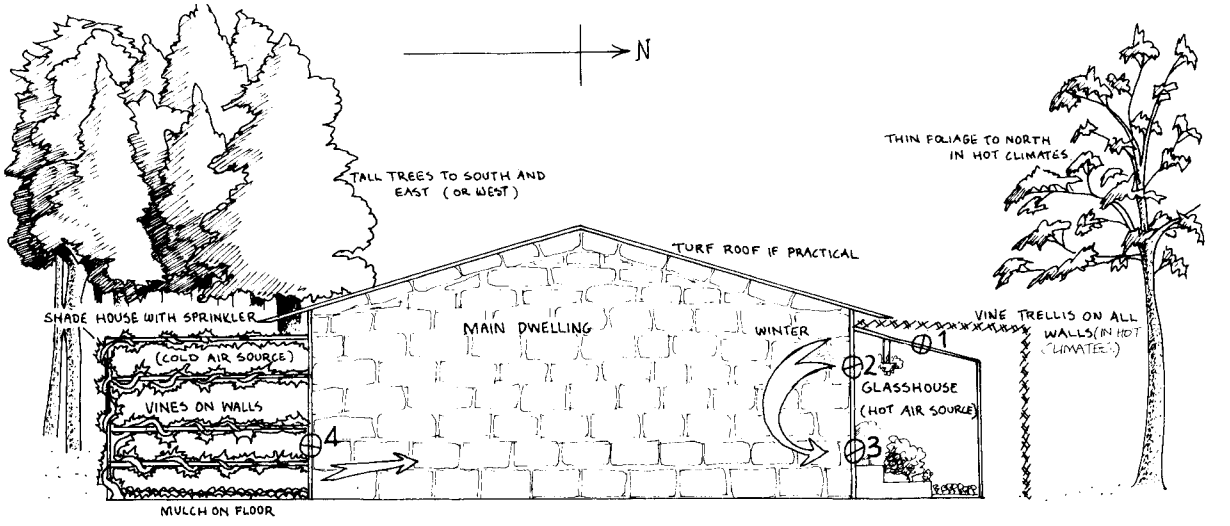
PLAN

- all walls and ceilings, and the perimeter (1½ m) under floor slabs are insulated. Seagrass (*Zostera*) is the safest insulation, but insulation made from treated waste newspaper is also efficient;
- massive structures such as chimneys, floor slabs, brick walls, tanks of water etc. are (where possible) *inside* the insulation barrier and therefore act as heat banks. The ideal house is "reverse brick veneer": bricks used are inside the house insulation[8];
- the eaves of the house, and the height or depth of windows are so adjusted that winter sun strikes the full width of the front floor slabs, and that the summer sun does not reach the walls (Fig. 6.21);
- all windows to the N. and S. are fitted with heavy, floor to ceiling, well-fitted, pelmetted, curtains or blinds.

Such homes are not only cheaper to build and cheaper to maintain than houses which need oil heaters and fireplaces, but most importantly they enable people to survive in warmth and comfort without recourse to oil-based fuels. It is no longer necessary, nor perhaps even sensible, to build any other type of house than one which saves or generates energy.



⊕ 1~4 ARE VENTS OPEN 2 AND 3 IN WINTER.
OPEN 1, 3 AND 4 IN SUMMER.
EVERGREEN VINES TO SOUTH (TECOMA, PASSIONFRUIT, etc.)
DECIDUOUS VINES TO NORTH (GRAPE, etc.)

FIG. 6.2: HOUSE MODIFIED BY ATTACHED SHADE HOUSE AND GREENHOUSE, TRELLIS, VINES. SEE ALSO REFS. 8 AND 34.

2 HOUSE MODIFICATIONS

Changes to existing structures follow the same set of criteria. An attached glasshouse to the north and a shadehouse to the south (Fig. 6.2) plus sun-trap planting, trellis, and insulation go a long way to reforming an existing house. The main problem areas lie in the often perverse arrangement of rooms in older houses, many of which face the road rather than the sun, and in the mania for glass windows in all outside walls. (At least the glass is available for more sensible use, or for double-glazing smaller window areas.) We can summarize ways to make older houses more energy-efficient, as below:

- the planting of sun trap trees, attachment of trellis or shrubberies to the S.E. and W.;
- attaching a glasshouse to the N. side if possible;
- attaching a shadehouse to the S. side in hot summer climates (Figs. 6.1 & 6.4);

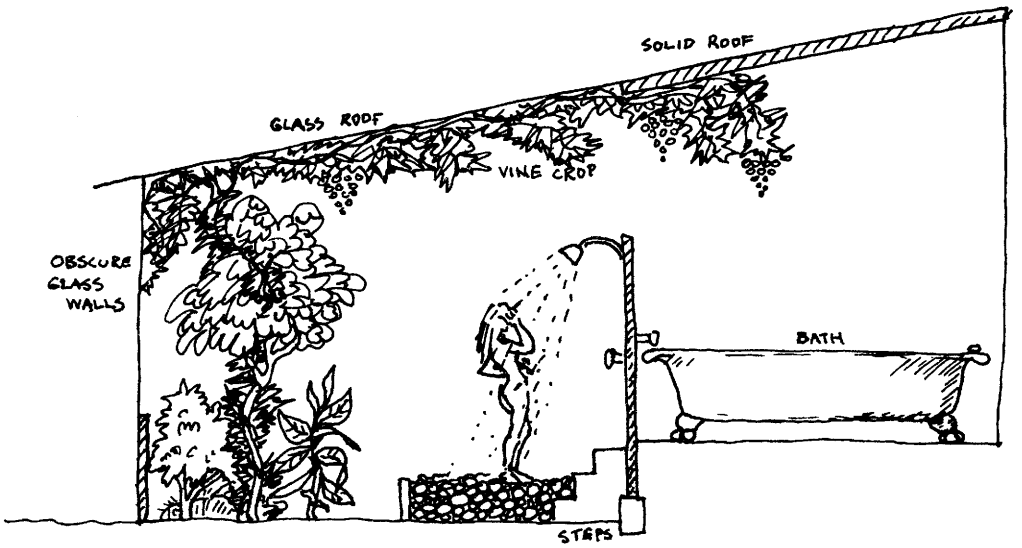


FIG. 6·13: BATHROOM GLASSHOUSE. SHOWER OVER PEBBLE BED KEEPS PLANTS MOIST. CAN BE ATTACHED TO EXISTING BATHROOM AS 'HOT' OR 'COLD' GLASSHOUSE.

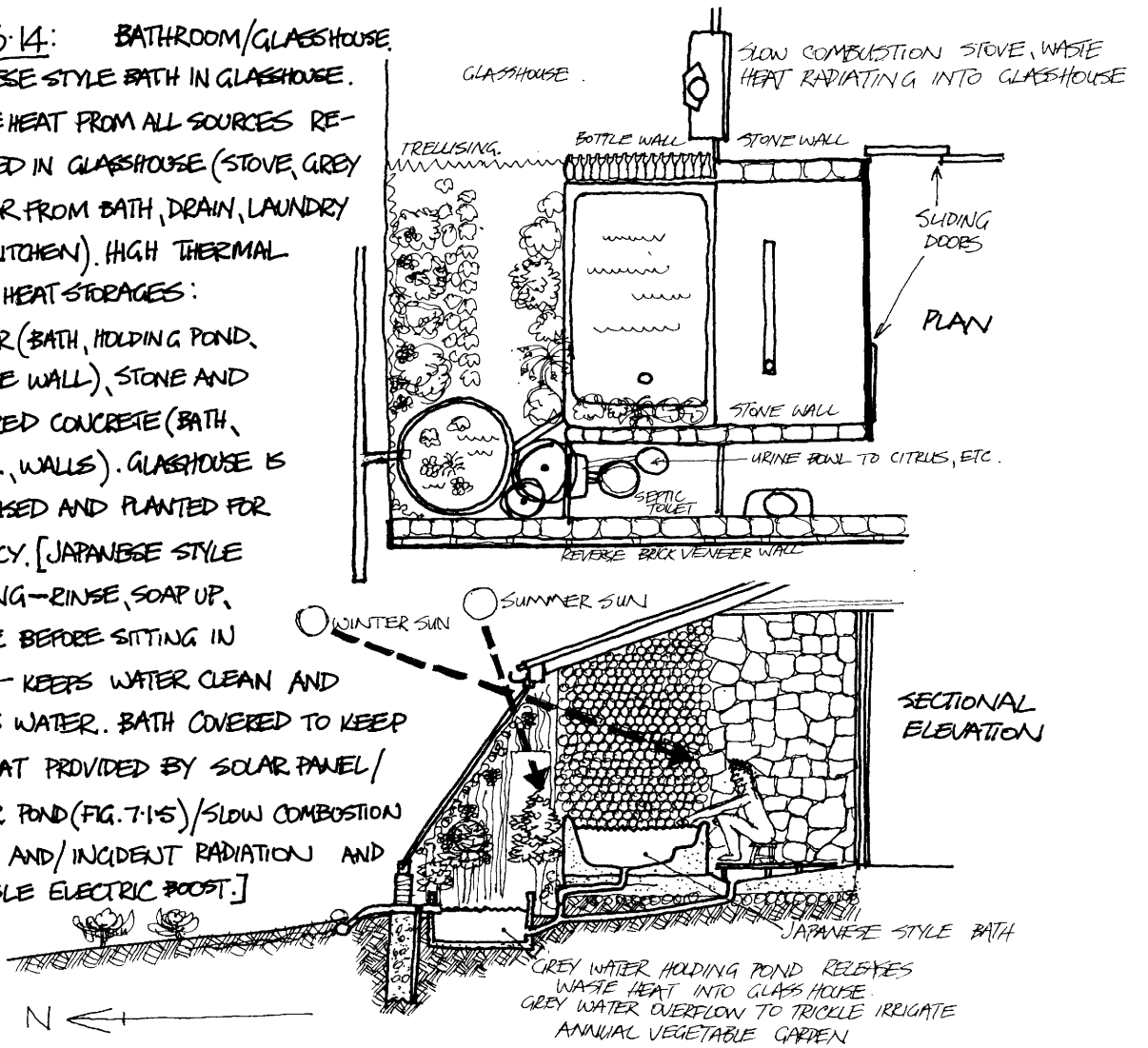



FIG. 6·14: BATHROOM/GLASSHOUSE. JAPANESE STYLE BATH IN GLASSHOUSE. WASTE HEAT FROM ALL SOURCES RELEASED IN GLASSHOUSE (STOVE, GREY WATER FROM BATH, DRAIN, LAUNDRY AND KITCHEN). HIGH THERMAL MASS HEAT STORAGES: WATER (BATH, HOLDING POND, BOTTLE WALL), STONE AND COVERED CONCRETE (BATH, FLOOR, WALLS). GLASSHOUSE IS TRELLISED AND PLANTED FOR PRIVACY. [JAPANESE STYLE BATHING—RINSE, SOAP UP, RINSE BEFORE SITTING IN BATH—KEEPS WATER CLEAN AND SAVES WATER. BATH COVERED TO KEEP IN HEAT PROVIDED BY SOLAR PANEL/SOLAR POND (FIG. 7·15)/SLOW COMBUSTION STOVE AND/INCIDENT RADIATION AND POSSIBLE ELECTRIC BOOST.]